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Environmental Protection Agency

Contract No. 68-W9-0053

PRELIMINARY ASSESSMENT (PA)

METRUM FACILITY
LITTLETON, COLORADO

Work Assignment No. 18-8JZZ

JULY 18, 1996

URS
CONSULTANTS, INC.

Brown and Caldwell
Harza Environmental Services, Inc.
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PRELIMINARY ASSESSMENT

Metrum Facility Site
Littleton, Colorado

U.S. EPA Contract No. 68-W9-0053
Work Assignment No. 18-8JZZ

EPA ID #COD042638239

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PRELIMINARY ASSESSMENT
Metrum Facility
Littleton, Arapahoe County, Colorado

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1.0 INTRODUCTION

This Preliminary Assessment (PA) of the Metrum Facility (Metrum) site in Arapahoe County, Colorado (CERCLIS ID# COD042638239) has been prepared to satisfy the requirements of Work Assignment #18-8JZZ issued to URS Consultants, Inc. (URS) by the Region VIII office of the U.S. Environmental Protection Agency (EPA). A site reconnaissance was conducted by URS personnel on May 5, 1995. This PA is the result of observations made during the site reconnaissance; information obtained from federal, state, city and county agencies; and personal communication with current facility employees.

2.0 OBJECTIVES

The objectives of this report are to:

- determine contaminant characteristics and quantify (if possible) potential waste sources;
- report on the adequacy of the containment of waste sources;
- assess the potential for contaminant migration from the site;
- identify potential target populations; and
- determine the potential site impacts to public health and the environment.

3.0 SITE DESCRIPTION

3.1 SITE LOCATION AND DESCRIPTION

The Metrum site is located in the metropolitan Denver area, approximately 11 miles south of downtown Denver. The site occupies approximately 42 acres in the northeast quarter of T. 5 S., R. 67 W., Section 31 of the Highlands Ranch Quadrangle (U.S. Geological Survey (USGS) 1965a) (Figure 1). The approximate site coordinates are 39° 34'44" N. latitude and 104° 55'43" W. longitude. The site specific street address is 4800 East Dry Creek Road. The site is bordered on the north by East Dry Creek Road, on the east by a residential development, on the south by a residential subdivision and on the west by an open field (photos 1, 2 and 3) URS Consultants, Inc. (URS) 1995). A main building occupying approximately 150,000 square feet and several smaller buildings are present on the site (Figure 2).

3.2 SITE HISTORY AND PREVIOUS WORK

The Metrum site is currently owned by Alliant Techsystems, Inc., (Alliant) of Hopkins, Minnesota (Arapahoe County Assessor's Office 1995). Prior to 1957, the site property was used for agriculture. In 1957, a small industrial manufacturing facility was built on the property by TRW, Incorporated. The type of manufacturing operations at that time is unknown. In the early 1960s, Honeywell Inc., Test Instruments Division, purchased the facility and began manufacturing data recording and information storage equipment (Harding Lawson Associates (HLA) 1993). In 1990, the Honeywell Test Instruments Division and two other divisions of Honeywell, Inc. were spun-off to form Alliant, which became the owner of the facility. At the same time the facility became a separate, wholly-owned business of Alliant and was renamed Metrum Information Storage (Colorado Department of Public Health and the Environment (CDPHE) 1990). Metrum Information Storage continued to manufacture data recording and information storage equipment and was considered to be a small quantity generator of hazardous waste. In 1992 the Metrum Information Storage business was purchased by Group Technologies Company and was renamed Metrum, Inc. The property and buildings remained under the ownership of Alliant and, currently, Metrum, Inc. only leases the building (Metrum, Inc. 1995). In 1993, 31 acres of Alliant property adjacent to and east of the site was purchased by Tradition Concepts for residential development (HLA 1993).

The buildings at the site have increased in size and number since the initial construction of the facility in 1957 including the installation of five underground storage tanks, a chemical storage area, a flammable substance storage building and a plating shop (Figure 2) (HLA 1993).

Contamination at the site was originally identified in 1990 during a Phase I Site Assessment (PSA) of the site conducted for Honeywell, Inc. by McCulley, Frick and Gilman, Inc. (Alliant 1995). The PSA included the installation of three monitoring wells and a geochemical soil boring. The results of the PSA indicated the presence of volatile organic compounds (VOCs) in groundwater samples from three monitoring wells located immediately west of the main building. Chlorinated hydrocarbons (trichloroethene (TCE), 1,1,1-trichloroethane (TCA) and 1,1-dichloroethene (1,1-DCE)) were detected in groundwater samples collected from monitoring well MW-1. The location of monitoring well MW-1 is indicated in Figure 2 (HLA 1993).

Subsequent investigations of the site were conducted by Harding Lawson Associates (HLA) for Alliant for the purpose of characterizing the nature and extent of contamination at the site. These investigations include: a Phase IIa Environmental Investigation conducted between January 1992 and June 1992, a Due Diligence Environmental Investigation conducted in 1992 in support of the sale of a 31-acre parcel of land adjacent to and east of the site, and Phase IIb and Phase IIc soil and hydrogeologic investigations conducted between December 1992 and May 1994 (HLA 1992; HLA 1993; HLA 1994).

These investigations included the installation, sampling and analysis of approximately 30 groundwater monitoring wells screened in the Dawson and Denver aquifers and collection and analysis of more than 60 soil samples. Soil samples were collected from soil borings at varying depths ranging from 0.5 feet to approximately 35 feet below ground surface (bgs). Soil samples were analyzed for VOCs, metals and cyanide. Groundwater samples were analyzed for VOCs, total and dissolved metals and gross alpha and gross beta radionuclides. Approved EPA methods were used to analyze the samples and the analytical results were validated and qualified. The investigations concluded that, based on the analytical results of soil samples collected from the site, a potential source area of VOCs (primarily chlorinated hydrocarbons) exists to the west of the main building and east of the building constructed in 1974 (Figure 2) (HLA 1994). The investigations further concluded that the concentrations of metals detected in soils at the site were within published ranges of metals concentrations expected to occur naturally in soils, and a discrete source of metals contamination is not present at the site (HLA 1993; HLA 1994). The results of the groundwater sampling at the site are detailed in Section 4.2, "GROUNDWATER PATHWAY."

3.3 SITE CHARACTERISTICS

3.3.1 Geology

The site is situated within the eastern portion of the north-south trending Denver Basin. The major bedrock formations present in the Denver Basin include, from shallowest to deepest, the Dawson Arkose, the Denver Formation, the Arapahoe Formation, the Laramie Formation and the Fox Hills Sandstone (USGS 1983a).

The site is underlain by approximately 10 feet of Quaternary Age sediments composed of sand, silt and clay (USGS 1972). The Dawson Arkose underlies the Quaternary sediments and consists of arkosic conglomerates and coarse sandstones interbedded with siltstones, shales and lignitic coal beds. The Dawson Arkose is separated into upper and lower members and previous investigations at the site indicate that the Dawson Arkose is generally less than 100 feet thick in the site area (HLA 1993).

The Dawson Arkose is unconformably underlain by the Cretaceous and Paleocene Age Denver Formation. The formation consists of interbedded claystones, siltstones, fine-grained sandstones and lignites. The sandstone units are generally lenticular and discontinuous in nature. The Denver Formation ranges from approximately 600 feet to 1,600 feet in thickness (HLA 1993).

3.3.2 Hydrogeology

The hydrogeology of the Denver Basin is characterized by four principal bedrock aquifers which are, from shallowest to deepest, the Dawson Aquifer, the Denver Aquifer, the Arapahoe Aquifer and the Laramie-Fox Hills Aquifer (USGS 1983a).

Groundwater primarily occurs in poorly to moderately consolidated saturated conglomerates and arkosic sandstones of the Dawson Aquifer. The Metrum Facility is located near the northern extent of the Dawson Aquifer and the aquifer pinches out within 4 miles to the north and west of the site (USGS 1983a). The depth to groundwater at the site is approximately 30 feet bgs. The lateral hydraulic conductivity of the Dawson Aquifer is approximately $7x10^{-5}$ to $1x10^{-3}$ centimeters per second (cm/s) and recharge to the aquifer is primarily from infiltration of precipitation (HLA 1993). The Dawson Aquifer is used for municipal, domestic and irrigation purposes (State of Colorado, Office of the State Engineer, Water Resources Division (CDWR) 1995). Regionally, groundwater flow in the Dawson Aquifer is to the north-northeast. However, hydrogeologic data obtained from previous investigations at the site indicate that the Metrum site is located on a groundwater divide corresponding to a topographic high and

local groundwater flow is to the west and southeast away from the groundwater divide (HLA 1993).

The Denver Aquifer is separated from the overlying Dawson Aquifer by approximately 20 feet to 50 feet of clay and clay shale; however, the potential exists for downward groundwater flow between the Dawson Aquifer and the Denver Aquifer (HLA 1993). The Denver Aquifer consists of a 600- to 1,000-foot thick series of interbedded shale, claystone, siltstone and sandstone (USGS 1983a). The vertical hydraulic conductivity between the Dawson Aquifer and the Denver Aquifer is approximately $1x10^{-8}$ cm/s. The lateral hydraulic conductivity of the Denver Aquifer is approximately $1.8x10^{-4}$ to $5.4x10^{-4}$ cm/s. Recharge to the aquifer is from infiltration of precipitation and from the overlying Dawson Aquifer. Discharge from the aquifer is to alluvial streams and aquifers (HLA 1993). The Denver Aquifer is used for municipal and domestic purposes (CDWR 1995).

The Arapahoe Aquifer consists of a 400- to 700-foot thick sequence of conglomerate, sandstone, siltstone and shale. The upper portion of the aquifer consists of between 200 feet and 300 feet of shale with interbedded conglomerate and sandstone. Recharge to the aquifer is primarily from infiltration of groundwater from the overlying Denver Aquifer. The average hydraulic conductivity of the Arapahoe Aquifer is approximately 7 feet per day in the vicinity of the site and groundwater flow is to the northwest (USGS 1983a). The Arapahoe Aquifer is primarily used for municipal purposes (CDWR 1995).

The Laramie-Fox Hills Aquifer occurs in the lower sandstone and shale units of the Laramie Formation and the upper sandstone and siltstone units of the Fox Hills Sandstone. The aquifer is up to 300 feet thick in the central region of the Denver Basin. The average hydraulic conductivity of the Laramie-Fox Hills Aquifer is approximately 2 feet per day in the vicinity of the site (USGS 1983a).

3.3.3 Hydrology

The Metrum site is situated on a topographic divide separating the Willow Creek drainage to the east and the Big Dry Creek drainage to the west. The topography of the site indicates that surface water runoff from the site generally flows northwest toward Big Dry Creek or southeast toward Willow Creek. A northwest-southeast trending intermittent drainage is present within approximately 500 feet to the west of the site. Surface water runoff from the site may potentially enter this drainage and flow approximately 1.9 miles northwest to Big Dry Creek (USGS 1965a). Big Dry Creek flows approximately 4.2 miles northwest before joining with the South Platte River. The South Platte River flows north for 8.9 miles to the 15-mile target distance limit (Figure 1) (USGS 1965a, 1965b, 1965c and 1965e). The flow rate of Big Dry Creek is not known; however, the average annual flow rate of the South Platte River, as measured approximately 2.8 miles downstream of the confluence with Big Dry Creek, is approximately 290 cubic feet per second (USGS 1994). Surface water runoff to the southeast of the site may enter a drainage channel which diverts runoff to a storm sewer beneath South Holly Street. The storm sewer may eventually discharge to the Englewood Dam, located approximately one-half mile northeast of the site (URS 1995). The site is not located in a floodplain (Federal Emergency Management Agency 1993).

3.3.4 Climate

The city of Denver is located in a semiarid climate zone. The site is situated at an elevation of approximately 5,730 above mean sea level (HLA 1993). The mean annual precipitation, as totaled from the University of Delaware (UD) database, is 15.0 inches. The net annual precipitation, as calculated from precipitation and evaporation data from the UD database, is 2.6 inches (University of Delaware Center for Climatic Research, Department of Geography 1986). The 2-year, 24-hour rainfall event for this area is 1.5 inches (Dunne and Leopold 1978).

4.0 PRELIMINARY PATHWAY ANALYSIS

4.1 SOURCE CHARACTERIZATION

During the Phase IIa investigation conducted by HLA in 1992, former and current employees of the Metrum Facility were interviewed to determine historical waste- handling practices at the site. Employees indicated that spent solvents (including tetrachloroethene (PCE)), used flux, alcohols, paint thinners and paint strippers were often discarded on the dirt ground surface near the Former Chemical Storage Area (Figure 2). Waste chemicals were used for weed control on-site and also discarded in an open field south of the Former Chemical Storage Area (HLA, 1992).

In addition to the above waste disposal practices, spills and leaks of various chemicals at the site were documented. The plating shop at the site was used for miscellaneous parts plating and utilized typical plate shop chemicals such as chromates, zinc and acids. On occasion, the plating tanks were overfilled and the plating solutions overflowed into floor gravity drains. The interviews indicated that the drain pipes in the plating shop may have been broken at some time and liquids may have escaped from the drain pipes to the subsurface soils (HLA 1992). The interviewees also reported that a 500-gallon aboveground TCA tank located on the west side of the main building was occasionally overfilled and TCA was spilled on the ground surface. The spill frequency and quantities were not known (HLA 1992). The aboveground TCA tank was removed approximately 10 years ago. Five underground storage tanks (USTs) used for No. 2 fuel oil storage were located immediately west of the main building. Three of the USTs were removed prior to 1990. The remaining two USTs were abandoned in place in early 1995 (Alliant 1995).

The Colorado Department of Public Health and the Environment (CDPHE) conducted a hazardous waste inspection of the Metrum Information Storage facility on December 18, 1990. The inspection report indicates that, at that time, approximately 150 gallons of waste 1,1,1-TCA and an equal quantity of Freon 113 were generated on a yearly basis and shipped off-site for disposal. Manifests of off-site shipments of hazardous waste in 1989 and 1990 were reviewed by the CDPHE inspectors. The inspectors noted shipments of approximately 600 gallons of paint thinner, 50 gallons of degreaser waste, 100 gallons of waste flux and 45 gallons of cyanide

(CDPHE 1990). The inspectors also observed three 55-gallon drums of chromium-contaminated soil stored on site. The contaminated soil resulted from a spill of chromic acid and water from the container storage building. The soil had been excavated and, according to the plant manager, had a chromium concentration of approximately 100 parts per million (ppm). The lateral and vertical extent of soil contamination is not known and the plant manager did not know which analytical method was used to analyze the soil (CDPHE 1990).

The analytical results of soil samples collected at the site during previous investigations indicate that VOCs, primarily chlorinated hydrocarbons such as TCE, PCE, TCA, 1,1 - DCE and 1,2-DCE, are present in soils at the site. TCE concentrations up to 480 micrograms per kilogram (μg/kg) were detected in soils west of the main building. With the exception of two soil samples, VOC detections generally occurred at depths greater than 2 feet bgs (HLA 1991; HLA 1993; HLA 1994).

4.2 AIR PATHWAY

Potential targets of the air pathway include approximately 78,300 residents within 4 miles of the site, of whom approximately 460 residents live within one-quarter mile of the site (U.S. Department of Commerce, Bureau of the Census (USDOC) 1990). The nearest residence is located within 200 feet south of the site (Photo 2) (URS 1995). Approximately 165 acres of palustrine wetlands are located within 4 miles of the site (U.S. Fish and Wildlife Service (USFWS) 1989a; USFWS 1989b; USFWS 1989c; USFWS 1989d). The federally-listed endangered bald eagle and black-footed ferret, the federally-listed threatened Utes ladies tresses orchid and the Preble's meadow jumping mouse, a candidate for federal-listing as a threatened or endangered species, may also be present within 4 miles of the site (USFWS 1995; State of Colorado, Division of Wildlife (CDW 1995a). The majority of the site is either paved or covered with vegetation with isolated patches of exposed soil. Contamination was not observed at the ground surface during the site reconnaissance (URS 1995).

4.3 GROUNDWATER PATHWAY

Groundwater sampling results from the Phase IIa, Phase IIb and Phase IIc investigations indicate that a groundwater plume of TCE oriented in a northwest-southeast direction is located within the Dawson Aquifer underlying the site and extending into adjacent properties (Figure 3). HLA delineated the extent of the plume based on TCE concentrations greater than and equal to 5 micrograms per liter (μg/l) and determined that the plume extends approximately 1,200 feet to the west of the site and approximately 1,300 feet southeast of the site to South Holly Street. The plume appears to extend beneath the residential properties located to the southeast of the site. The highest TCE concentration (20,000 μg/l from a diluted sample) was detected in monitoring well MW-1 located adjacent to the west side of the main building (Figure 2) (HLA 1994).

TCE has a density greater than that of water and will tend to migrate vertically downward through the water column. Analytical results for the groundwater sampling conducted during the Phase IIc investigation indicate low concentrations of TCE in the lower regions of the Dawson Aquifer and within the clayey shale sequence separating the Dawson Aquifer from the underlying Denver Aquifer, indicating that vertical migration of TCE is occurring at the site. Groundwater samples from four monitoring wells screened in the Denver Formation had detections of chlorinated hydrocarbons including TCE, PCE, TCA and 1,1-DCE (HLA 1994). Groundwater sampling conducted by Radian Corporation for Alliant in December 1994 indicated similar results (Radian Corporation 1995). These results indicate that chlorinated solvents may have migrated vertically to the Denver Aquifer.

Groundwater samples collected from the Dawson Aquifer during the Phase IIc investigation were also analyzed for 23 dissolved metals and gross alpha and gross beta radionuclides. The following analytes were detected at the indicated range of concentrations: copper (6 μg/l - 9 μg/l), lead (7 μg/l - 9 μg/l), mercury (0.1 μg/l), selenium (39 μg/l - 230 μg/l), chromium (8 μg/l - 67 μg/l), vanadium (6 μg/l), gross alpha (11 picocuries per liter (pCi/l) - 150 pCi/l) and gross beta (9 pCi/l - 38 pCi/l). The Phase IIc investigation report concluded that the concentrations of metals and radionuclides detected in the samples were naturally occurring (HLA 1994).

From a listing of well permits for the area, approximately 186 municipal wells and 351 domestic wells were identified within 4 miles of the site. The nearest domestic well is located approximately one-half mile east of the site and is completed to a depth of 365 feet (CDWR 1995). Based on an average of 2.8 people per household in Arapahoe and Douglas counties, approximately 980 people potentially obtain drinking water from domestic wells. However, because of the recent residential development in the area, it is likely that this domestic well use is overestimated and that almost all of the residential drinking water is provided through municipal sources (Willows Water District (WWD) 1995b). Two water districts use 23 municipal wells located within 4 miles of the site (Figure 1) to provide drinking water to approximately 20,000 residents. These municipal wells draw groundwater primarily from three aquifers: the Arapahoe aquifer, the Denver aquifer, and the Laramie-Fox Hills aquifer. The approximate populations served by each aquifer are as follows: the Arapahoe aquifer - 13,000 people; the Denver aquifer - 5,200; and the Laramie-Fox Hills aquifer - 1,700 people (WWD 1995a; WWD 1995b; Centennial Water District 1995).

The WWD maintains 19 municipal wells within 4 miles of the Metrum site. These wells are located northeast, east, and southeast of the site and range in depth from 684 feet to 2,200 feet bgs. The most proximal municipal well is located approximately 0.6 miles southeast and downgradient of the site and is completed in the Arapahoe Aquifer at a depth of 1,556 feet bgs. The WWD provides drinking water to 4,516 taps or approximately 18,000 people in the area. Four of these municipal wells are completed in the Dawson or Denver aquifers between 0.5 mile and 2.0 miles northeast, east and southeast of the site (WWD 1995a; WWD 1995b). The only treatment process utilized by WWD is chlorination of the water before distribution to customers. Routine sampling of the well water by the WWD prior to distribution indicates that VOC concentrations have been less than 0.005 milligrams per liter (mg/l) and that the water quality has remained constant over the last 20 years (WWD 1995b).

In late 1995 Alliant began operating a two-phase extraction system to remediate site soil and groundwater. Alliant is also conducting quarterly groundwater monitoring at the site. CDPHE is currently reviewing first quarter monitoring results to evaluate extraction system effectiveness and is issuing an Order on Consent specifying the conditions and anticipated time frame of site remediation (CDPHE 1996).

4.4 SURFACE WATER PATHWAY

The primary surface water bodies associated with the site include Big Dry Creek and the South Platte River. The city of Englewood obtains its drinking water from a surface water intake located on the South Platte River within one-quarter mile downstream of the confluence of Big Dry Creek. The city of Englewood provides drinking water to approximately 33,000 residents (City of Englewood Water Department 1995). There is approximately 1 mile of palustrine emergent and forested wetlands along the South Platte River within 15 miles downstream of the site (USFWS 1989a; USFWS 1989b; USFWS 1989c; USFWS 1989d). The federally-listed endangered Bald Eagle and the federally-threatened Utes Ladies Tresses Orchid may potentially be present along the surface water pathway within 15 downstream miles of the site (USFWS 1995). The South Platte River between the Big Dry Creek confluence and the 15-mile downstream limit is used recreationally for fishing and rafting. There are no fishing production figures for this reach of the river (CDW 1995b).

4.5 SOIL EXPOSURE PATHWAY

Approximately 7,370 residents live within 1 mile of the site including 460 residents within one-quarter mile (USDOC 1990). The nearest residence is located within 200 feet south of the site and additional residential developments are in construction immediately to the east of the site (photos 1 and 2) (URS 1995). There are 200 Metrum, Inc. employees on site (Metrum 1995). Access to the site is not restricted to the east, and a playground for the residential development to the east of the site is located within approximately 200 feet of the site (URS 1995). The federally-listed endangered black-footed ferret may potentially exist in the area (CDW 1995a). However, habitat which may support a black-footed ferret population, such as a prairie dog colonies, were not observed at the site during the site reconnaissance (URS 1995).

The site has asphalt parking areas to the north and east and vegetation is present in the south and west portions of the site. Occasional areas of exposed soil are present and a soil sample collected during the Phase IIb investigation from a potential waste source area southwest of the main building contained VOCs within the upper 2 feet of soil. Additional soil samples collected from within the upper 2 feet of soil at the site during previous investigations did not contain VOCs (HLA 1993; HLA 1994).

5.0 SUMMARY

Manufacturing of data recording and information storage equipment at the Metrum site has taken place since approximately 1957. The manufacturing process routinely utilized solvents such as TCA as a degreasing agent. Chemical storage areas, fuel oil storage tanks and a 500-gallon aboveground TCA tank were present on the site at various times. Historical waste handling practices at the site included disposing of spent solvents on the ground surface. Spills of plating shop chemicals and TCA from overfilled tanks were also reported by previous employees of the facility. Hazardous substances detected in soil samples at the site include TCA, TCE, PCE, 1-1-DCE and 1,2-DCE. The site property and buildings are owned by Alliant of Hopkins, Minnesota.

Groundwater contamination at the site was originally identified in 1990 during a Phase I Site Assessment conducted for Honeywell, Inc. Subsequent investigations at the site have revealed that the groundwater underlying the site is contaminated with VOCs, primarily chlorinated hydrocarbons. A plume of TCE has been identified as a result of the investigations. The plume trends northwest-southeast following the local groundwater flow directions and extends below a residential development to the southeast of the site. Approximately 20,000 residents may obtain drinking water from municipal wells located within 4 miles of the site. The most proximal municipal well is located approximately 0.6 miles southeast of the site and is completed to a depth of 1,556 feet bgs.

Soil sampling at the site indicates that areas adjacent to and west of the main building may contain VOCs within the upper 2 feet of soil. Access to the site is not restricted and existing and planned residential developments are located within 200 feet of the site. The site is either paved or vegetated with occasional areas of exposed soil.

Alliant is currently using a two-phase extraction system to remediate soil and groundwater at the site.

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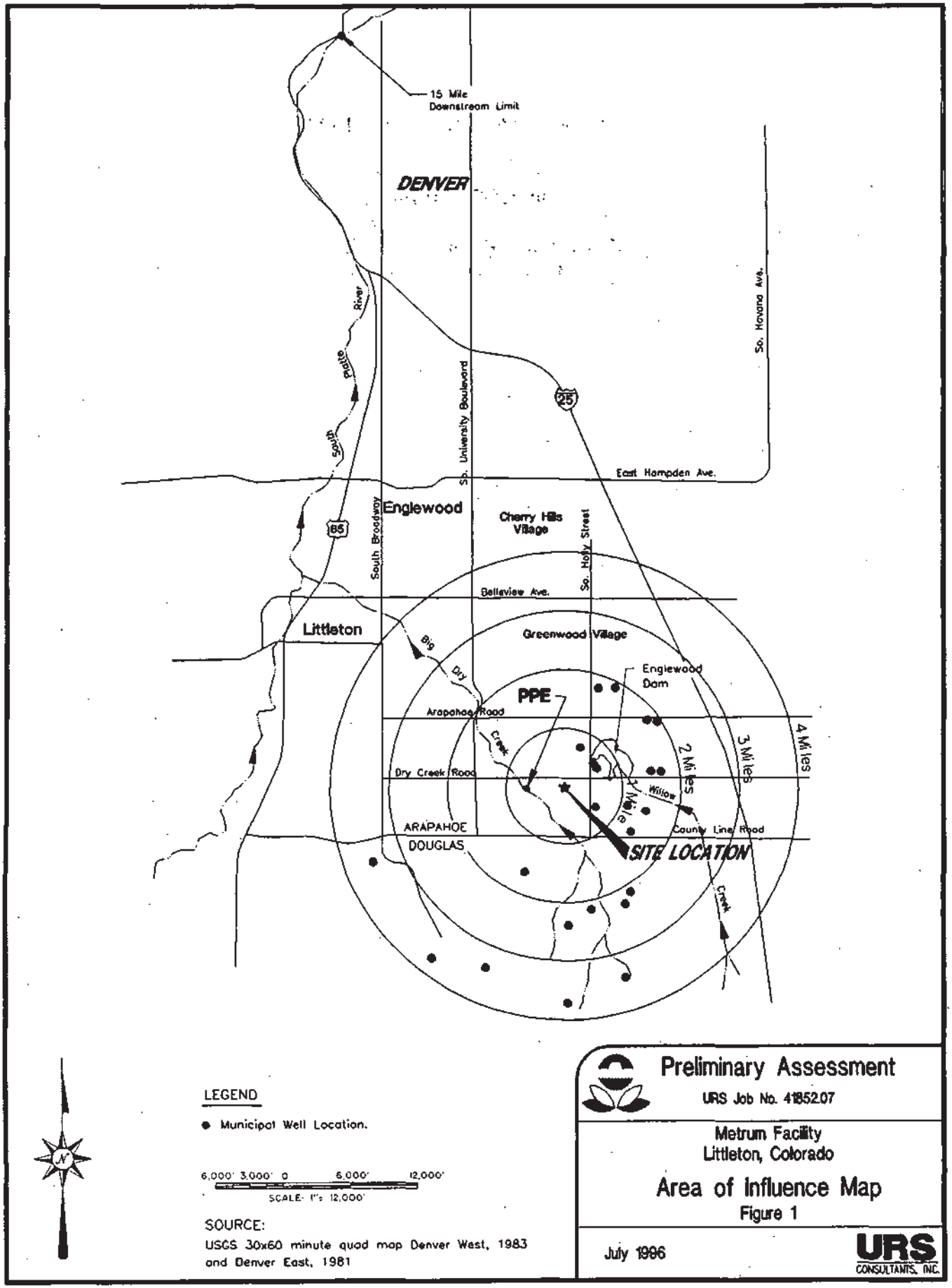

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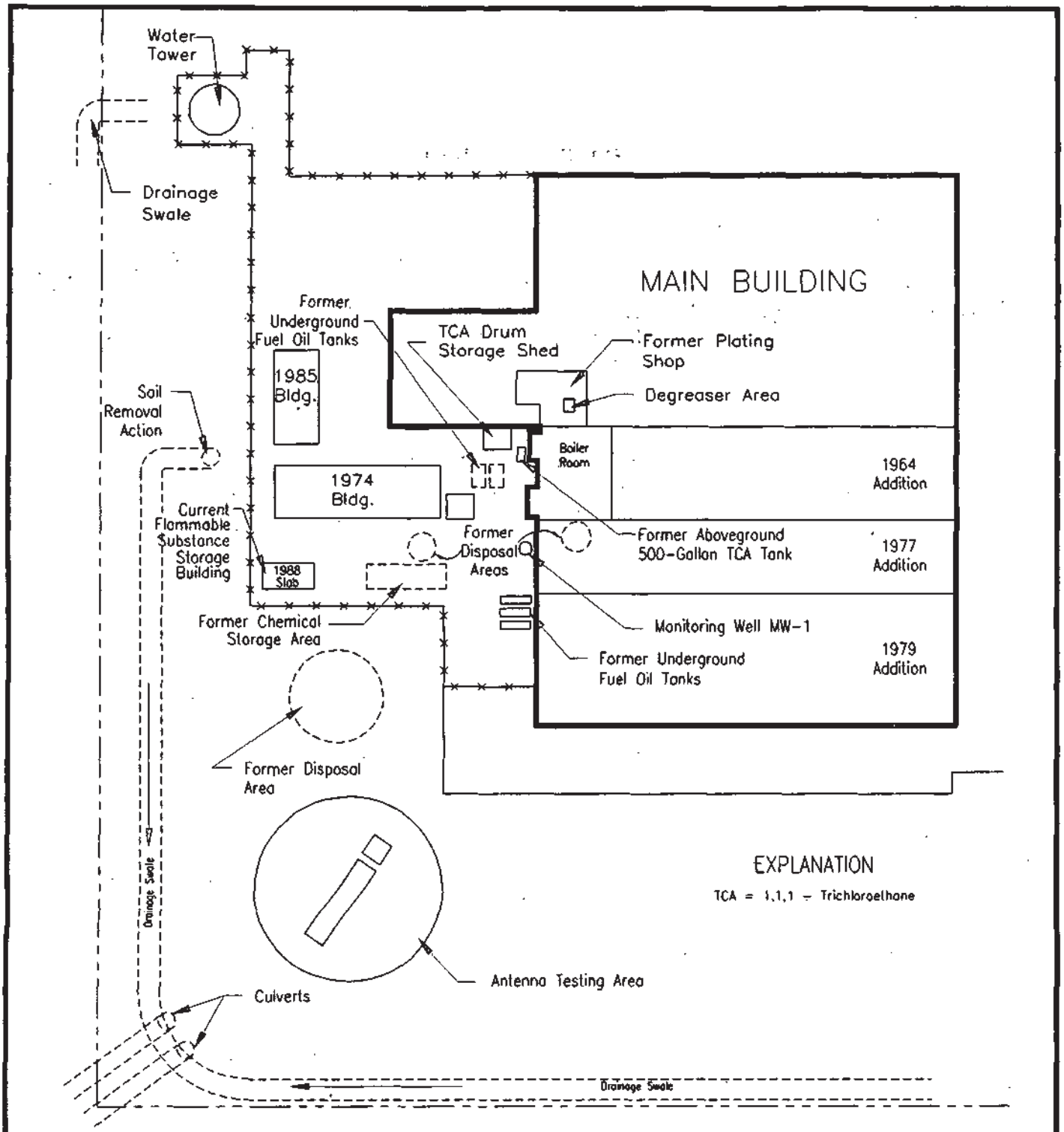
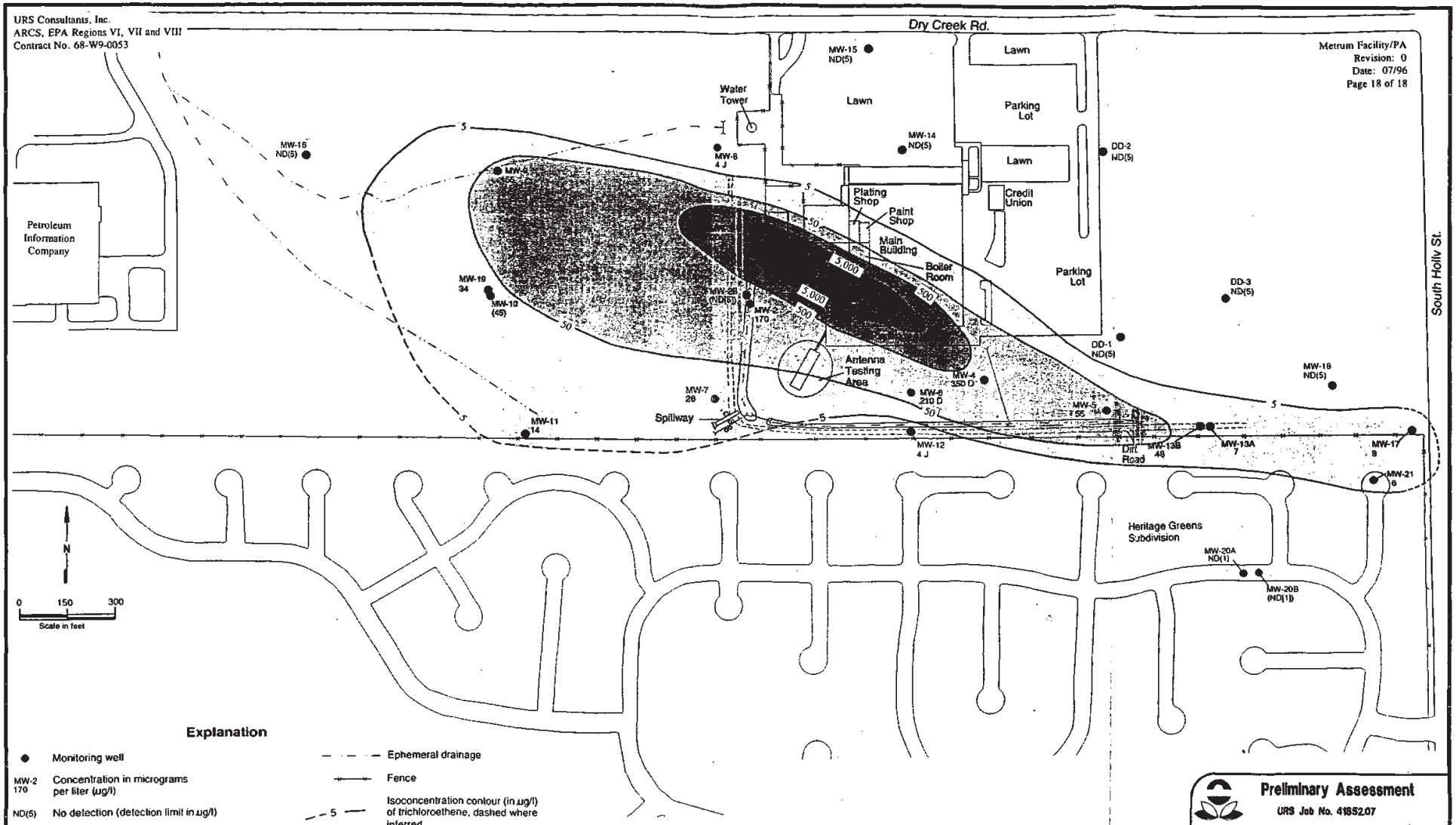

Water Tower
Drainage Swale
MAIN BUILDING
Former Underground Fuel Oil Tanks
TCA Drum Storage Shed
Former Plating Shop
Degreaser Area
1985 Bldg.
Soil Removal Action
Boiler Room
1964 Addition
1974 Bldg.
Current Flammable Substance Storage Building
1988 Slab
Former Disposal Areas
Former Aboveground 500-Gallon TCA Tank
1977 Addition
Former Chemical Storage Area
Monitoring Well MW-1
Former Underground Fuel Oil Tanks
1979 Addition
Former Disposal Area
EXPLANATION
TCA = 1,1,1 - Trichloroethane
Drainage Swale
Antenna Testing Area
Culverts
Drainage Swale
N
50 25 0 50 100
SCALE: 1" = 100'
SOURCE:
Harding Lawson Associates (HLA), 1992
Preliminary Assessment
URS Job No. 4185207
Metrum Facility
Littleton, Colorado
Site Map
Figure 2
July 1996
URS CONSULTANTS, INC.

URS Consultants, Inc.
ARCS, EPA Regions VI, VII and VIII
Contract No. 68-W9-0053



Explanation

- ● Monitoring well
- MW-2 170 — Concentration in micrograms per liter (µg/l)
- ND(5) — No detection (detection limit in µg/l)
- J — Result is estimated
- D — Result is from a diluted sample
- 5 to 50 micrograms per liter (µg/l)
- 50 to 500 micrograms per liter (µg/l)
- 500 to 5000 micrograms per liter (µg/l)
- Greater than 5000 micrograms per liter (µg/l)
- Ephemeral drainage
- Fence
- 5 — Isoconcentration contour (in µg/l) of trichloroethene, dashed where inferred

Notes:

1. Locations and scale are approximate.
2. Monitoring wells MW-1B, MW-2B, MW-10, and MW-20B are interpreted to monitor a confined aquifer; therefore, analytical results for these wells are presented in parentheses.

SOURCE: Harding Lawson Associates 1994

Preliminary Assessment
URS Job No. 41852.07

Metrum Facility
Littleton, Colorado

Trichloroethene Distribution in Groundwater

July 1996 Figure 3

/disk0c/cadd/arcs/denver/metrum/fig3.dwg kdb 7/17/96 08:30

APPENDIX A

PA Report Form 2050-0095

OMB Approval Number: 2050-0095
Approved for Use Through: 1/92

Potential Hazardous Waste Site Preliminary Assessment Form

Identification

State: CO | CERCLIS Number: COD 042638239

CERCLIS Discovery Date: 1/24/95

1. General Site Information

Name:	Street Address:
Metrum Information Storage	4800 E. Dry Creek Road

City:	State:	Zip Code:	County:	Co. Code:	Cong. Dist:
Littleton	CO	80122	Arapahoe		

Latitude:	Longitude:	Approximate Area of Site:	Status of Site:
39 ° 34 ' 44 .2"	104 ° 55 ' 43 .2"	41.6 Acres ~1,812,100 Square Ft	[X] Active [ ] Inactive [ ] Not Specified [ ] NA (GW pump. etc.)

2. Owner/Operator Information

Owner:	Operator:
Alliant Techsystems, Inc.	Metrum Inc. (Business only)
Street Address: 600 NE 2nd Street	Street Address: 4800 E. Dry Creek Road
City: Hopkins	City: Littleton CO
State: MN | Zip Code: 55343 | Telephone: (612) 931-6973	State: CO | Zip Code: 80122 | Telephone: (303) 773-4700

Type of Ownership:
- [X] Private
- [ ] Federal Agency — Name _____
- [ ] State
- [ ] Indian
- [ ] County
- [ ] Municipal
- [ ] Not Specified
- [ ] Other _____

How Initially Identified:
- [ ] Citizen Complaint
- [ ] EPA Program
- [X] State/Local Program
- [ ] RCRA/CERCLA Notification
- [ ] Federal Program
- [ ] Incidental
- [ ] Not Specified
- [ ] Other _____

3. Site Evaluator Information

Name of Evaluator:	Agency/Organization:	Date Prepared:
Ron Coringrato	UES Consultants, Inc.	6/02/95

Street Address:	City:	State:
1099 18th Street, #700	Denver	CO

Name of EPA or State Agency Contact:	Street Address:
Pat Smith	999 18th Street, Suite 500

City:	State:	Telephone:
Denver	CO	(303) 293-1202

4. Site Disposition (for EPA use only)

Emergency Response/Removal Assessment Recommendation:
- [ ] Yes
- [ ] No
- Date: _____

CERCLIS Recommendation:
- [ ] Higher Priority SI
- [ ] Lower Priority SI
- [ ] NFRAP
- [ ] RCRA
- [ ] Other _____
- Date: _____

Signature:

Name (type):

Position:

EPA | Potential Hazardous Waste Site
Preliminary Assessment Form - Page 2 of 4 | CERCLIS Number: COD 042638237

5. General Site Characteristics

Predominant Land Uses Within 1 Mile of Site (check all that apply):
- ☐ Industrial
- ☐ Commercial
- ☒ Residential
- ☐ Forest/Fields
- ☐ Agriculture
- ☐ Mining
- ☐ DOD
- ☐ DOE
- ☐ DOI
- ☐ Other Federal Facility
- ☐ Other _____

Site Setting:
- ☒ Urban
- ☐ Suburban
- ☐ Rural

Years of Operation:
Beginning Year 1957
Ending Year present
☐ Unknown

Type of Site Operations (check all that apply):
- ☒ Manufacturing (must check subcategory)
  - ☐ Lumber and Wood Products
  - ☐ Inorganic Chemicals
  - ☐ Plastic and/or Rubber Products
  - ☐ Paints, Varnishes
  - ☐ Industrial Organic Chemicals
  - ☐ Agricultural Chemicals (e.g., pesticides, fertilizers)
  - ☐ Miscellaneous Chemical Products (e.g., adhesives, explosives, ink)
  - ☐ Primary Metals
  - ☐ Metal Coating, Plating, Engraving
  - ☐ Metal Forging, Stamping
  - ☐ Fabricated Structural Metal Products
  - ☒ Electronic Equipment
  - ☐ Other Manufacturing
- ☐ Mining
  - ☐ Metals
  - ☐ Coal
  - ☐ Oil and Gas
  - ☐ Non-metallic Minerals
- ☐ Retail
- ☐ Recycling
- ☐ Junk/Salvage Yard
- ☐ Municipal Landfill
- ☐ Other Landfill
- ☐ DOD
- ☐ DOE
- ☐ DOI
- ☐ Other Federal Facility _____
- ☒ RCRA
  - ☐ Treatment, Storage, or Disposal
  - ☐ Large Quantity Generator
  - ☒ Small Quantity Generator
  - ☐ Subtitle D
    - ☐ Municipal
    - ☐ Industrial
  - ☐ "Converter"
  - ☐ "Processor Filer"
  - ☐ "Non- or Late Filer"
- ☐ Not Specified
- ☐ Other _____

Waste Generation:
- ☒ Onsite
- ☐ Offsite
- ☐ Onsite and Offsite

Waste Deposition Authorized By:
- ☐ Present Owner
- ☐ Former Owner
- ☐ Present & Former Owner
- ☐ Unauthorized
- ☒ Unknown

Waste Accessible to the Public:
- ☐ Yes
- ☒ No

Distance to Nearest Dwelling, School, or Workplace:
<2000 Feet

6. Waste Characteristics Information

Source Type (check all that apply)	Source Waste Quantity (measure units)	Tier*
☐ Landfill		
☐ Surface Impoundment		
☐ Drums		
☒ Tanks and Non-Drum Containers	500-gallons	1
☐ Chemical Waste Pile		
☐ Scrap Metal or Junk Pile		
☐ Tailings Pile		
☐ Trash Pile (open dump)		
☐ Land Treatment		
☒ Contaminated Ground Water Plume (unidentified source)	Unknown	
☐ Contaminated Surface Water/Sediment (unidentified source)		
☒ Contaminated Soil	Unknown	
☐ Other _____		
☐ No Sources		

* C = Containers, W = Watercourses, V = Volume, A = Area

General Types of Waste (check all that apply)
- ☐ Metals
- ☒ Organics
- ☒ Inorganics
- ☒ Solvents
- ☐ Paints/Pigments
- ☐ Laboratory/Hospital Waste
- ☐ Radioactive Waste
- ☐ Construction/Demolition Waste
- ☐ Pesticides/Herbicides
- ☐ Acids/Bases
- ☐ Oily Waste
- ☐ Municipal Waste
- ☐ Mining Waste
- ☐ Explosives
- ☐ Other _____

Physical State of Waste as Deposited (check all that apply):
- ☐ Solid
- ☐ Sludge
- ☐ Powder
- ☒ Liquid
- ☐ Gas

APPENDIX B

EPA PA Worksheet

PA WORKSHEET

Site Name Metrum Facility City, State Littleton, Colorado

CERCLIS ID # COD042638239

Reported by Ron Coringrato Date June 2, 1995

HIGHLIGHTS:

A) IS THERE QUALITATIVE OR QUANTITATIVE EVIDENCE OF A RELEASE TO AIR, SURFACE WATER, GROUNDWATER, OR SURFACE SOIL? DESCRIBE BRIEFLY.

More detail in items GW-1 (for groundwater pathway), SW-5 (for surface water pathway), A-1 (for air pathway), and SE-1 (for soil exposure pathway).

High concentrations of volatile organic compounds have been detected in the groundwater underlying the site.

B) IS THERE EVIDENCE OF AN **IMPACTED** TARGET POPULATION? DESCRIBE.

Pathway	Target	None/target Size	Brief Description	More Discussion In
Groundwater	Public drinking Water supply	0	N/A	N/A
	Domestic drinking Water supply	0	N/A	N/A
Surface Water	Drinking water	0	N/A	N/A
	Fishery	0	N/A	N/A
	Sens. env.	0	N/A	N/A
Soil Exposure	People within 200'	0	N/A	N/A
	Terrestrial sens. env.	0	N/A	N/A
Air	Population	0	N/A	N/A

SITE INFORMATION

G-1. Directions to the site (from nearest easily recognized point).

From the intersection of I-25 and Dry Creek Road, proceed west for approximately 2.7 miles (past South Holly Street). Site is located on the south side of Dry Creek Road.

G-2. Are there other potential sources in the neighborhood to be aware of as the site is evaluated? e.g., Is the site in an industrial area, near a railroad, along a highway? Are sources with similar contaminants to this site in the vicinity?

Site is not located in an industrial area or near other potential sources of similar contaminants.

Source of information: URS 1995

Background/Operating History

G-3. Describe the operating history of the site:

The land on which the facility is built was formerly used for agricultural purposes and was purchased for commercial development in 1956. A small manufacturing facility was built on the property by TRW, Inc. in 1957. Honeywell, Inc. purchased the facility in the early 1960s, and began manufacturing data recording and information storage equipment. In 1990, Alliant Techsystems, Inc. became the owner of the property as part of a spin-off from Honeywell. The facility was renamed Metrum Information Storage.

Source of information: HLA 1993

G-4. Describe site and nature of operations (property size, manufacturing, waste disposal, storage etc.):

The site occupies an area of approximately 42 acres. Data recording and information storage equipment is manufactured at the site. Solvents such as TCA were historically used at the site and often disposed of directly on the ground surface.

Source of information: Arapahoe County Assessor 1995; HLA 1993

G-5. Describe any emergency or remedial actions that have occurred at the site:

Chromium-contaminated soil was excavated from the site in September 1990 following a spill of chromic acid and water. Soil was also excavated from the western facility boundary in 1987 or 1988. The soil may have been contaminated with No. 2 fuel oil.

Source of information: CDPHE 1990; HLA 1992

G-6. Are there records or knowledge of accidents or spills involving site wastes? Are there Emergency Response Notification (ERNs) reports for this location?

Spills of TCA and plating shop chemicals (e.g., chromates, zincs and acids) were documented by employees of the facility in 1992. Exact quantities and frequency of spills is undetermined.

Source of information: HLA 1992

G-7. Describe existing sampling data and briefly summarize data quality (e.g. sample objective, age/comparability, analytical methods, detection limits, QA/QC, validatability):

Several environmental assessments of the site have been conducted for the site owner. Soil, groundwater and soil-gas samples have been collected from the site. Analytical results indicate that high concentrations of chlorinated hydrocarbons (TCE, DCE, TCA, PCE) are present in the groundwater underlying the site.

Source of information: HLA 1993

G-8. Is there any other local, state or federal regulatory involvement? Describe. Include permits, and names of contact individuals within each government organization.

AGENCY	PROGRAM	CONTACT	PHONE	PERMIT
Colorado Department of Public Health and the Environment	Hazardous Materials and Waste Management	Walter Aramenko	(303) 692-3362	None

G-9. Attach site sketch or schematic. Include all pertinent features including wells, storage areas, underground storage tanks, source areas, buildings, access roads, areas of ponded water. Refer to figure(s) submitted with text of report if appropriate.

Refer to Figure 2 of text.

SOURCE CHARACTERIZATION

WC-1. Describe each source at the site, on Table 1, in terms of source type, containment, size/area/volume/quantity, and substances present. See HRS Tables 2-5 and 5-2 for source descriptions, Tables 3-2, 4-2, 4-8, 5-6, 6-3, and 6-9 for containment.

See Table 1.

WC-2. Briefly describe how waste quantity was estimated (e.g., historical records or manifests, permit applications, air photo measurements, etc.):

Historic site maps and interviews with previous employees indicate that a 500-gallon aboveground TCA storage tank was present at the site.

Source of information: HLA 1992

WC-3. Describe any restrictions or barriers to accessibility of on-site sources.

The site is accessible to the public.

Source of information: URS 1995

GROUNDWATER CHARACTERISTICS

GW-1. Any positive or circumstantial evidence of a release to groundwater? Describe.

Yes. Volatile organic compounds (TCE, PCE, DCE) have been detected at elevated concentrations in groundwater at the site.

Source of information: HLA 1993

GW-2. Any positive or circumstantial evidence of a release to drinking water users? Describe analytes, detection limits, background, hits, number of users, locations, QA/QC.

None identified.

Source of information: WWD 1995b

GW-3. Briefly describe the geologic setting.

The site is situated in the western portion of the Denver Basin. The site is underlain by Quaternary Age deposits consisting of silt, sand and cobbles. The Quaternary Age deposits are underlain by bedrock consisting of, in descending stratigraphic order, the Dawson Arkose, the Denver Formation, the Arapahoe Formation, the Laramie Formation and the Fox Hills Sandstone.

GW-4. Describe geologic/hydrogeologic units on Table 2. Give names, descriptions, and characteristics of consolidated and unconsolidated zones beneath the site.

See Table 2.

GW-5. Is the site in an area of karst terrain or a karst aquifer? No.

GW-6. Net Precipitation (per HRS section 3.1.2.2).

The net annual precipitation as calculated from precipitation and evapotranspiration data obtained from UD is 2.60 inches.

SURFACE WATER CHARACTERISTICS

SW-1. Mean annual precipitation (per HRS section 4.0.2)= 15.0". If less than 20", then count intermittent channels as surface water.

SW-2. Discuss the probable surface water flow pattern from the site to surface waters:

Surface water from the site likely flows to the west-northwest toward an intermittent drainage approximately 500 feet west of the site.

Source of information: USGS 1994; URS 1995

SW-3. If surface water exists within 2 miles of the site, describe surface water segments within the 15-mile distance limit.

Segment Name	River/Lake/Type	Fresh/Salt Water	Start (mi.)	End (mi.)	Flow In cfs
Intermittent drainage	Intermittent	Fresh	0	1.9	N/A
Big Dry Creek	Intermittent	Fresh	1.9	4.2	N/A
South Platte River	River	Fresh	4.2	15.0	290

Groundwater to surface water distance 0.5 miles Angle Θ ~ 100°

SW-4. Provide a schematic diagram or simple figure which describes surface water segments. locates targets, identifies flow direction, PPE(s), etc. Refer to figure(s) submitted with text of report if appropriate.

Refer to Figure 1 of text.

SW-5. Any positive or circumstantial evidence of a release to surface water? Evidence of a release by direct observation? Is the source located in surface water? Describe.

None identified.

Source of information: HLA 1993; URS 1995

SW-6. Any positive or circumstantial evidence of a release to surface water target populations? Describe analytes, detection limits, background. hits, number of users, locations, QA/QC.

None identified.

Source of information: City of Englewood, Water Department 1995

SW-8. Is the site or portions thereof located in surface water? No.

The site is not located in a flood plain.

SW-9. Two-year 24-hour rainfall 1.5 inches

TARGETS

T-1. Discuss groundwater usage within four miles of the site:

Approximately 186 municipal wells and 350 domestic wells are potentially located within four miles of the site.

Source of information: CDWR 1995

T-2. Summarize the drinking water population served via groundwater within four miles of the site:

Distance	Denver Aquifer	Arapahoe Aquifer	Laramie-Fox Hills Aquifer
0 - 1/4 mile	0	0	0
1/4 - 1/2 mile	0	0	0
1/2 - 1 mile	857	1,714	857
1 - 2 miles	2,571	5,142	857
2 - 3 miles	1,818	1,714	0
3 - 4 miles	0	4,389	0

Attach calculations for population apportionment in blended systems.

T-3. Identify and locate any of the following surface water targets within 15 miles of the site: drinking water population(s) served by intakes, fisheries, sensitive environments described in Table 4-23 of the HRS, and wetlands as defined in the Federal Register.

Targets	Dist. From Site	SW Body	Flow In cfs	Population Served/Size (Incl. Units)	Contamination Known/Suspected
Wetlands	~ 6.2	South Platte River	290	N/A	None
Fishery	~ 5.7	South Platte River	290	N/A	None
City of Englewood	~ 6.1	South Platte River	290	33,000	None
Bald eagle/ Ute ladies tresses	~ 5.7	South Platte River	290	N/A	None

T-4. Summarize the population within a four-mile radius of the site:

	Total Pop.	Worker Pop.
on site	200	200
0 - 1/4 mi	460	
1/4 - 1/2 mi	1,380	
1/2 - 1 mi	5,530	
1 - 2 mi	16,760	
2 - 3 mi	22,570	
3 - 4 mi	31,600	

T-5. Identify and locate any terrestrial sensitive environments described in Table 5-5 of the HRS.

The federally-listed endangered Bald Eagle and Black-Footed Ferret, and the Preble's Meadow Jumping Mouse which is a candidate for federal listing as a threatened or endangered species may potentially be present within four miles of the site.

T-6. Describe any positive or circumstantial evidence of a release to air target populations? Of a release by direct observation where target population exists within 1/4 mile of the site? Describe analytes, detection limits, background, hits, number of users, locations, QA/QC.

None identified.

T-7. Identify and locate any potential or known resident soil exposure populations, if present. Describe conditions which lead the researcher to suspect contaminated soil within 200' of residences, if this condition exists.

No known resident soil exposure populations are present. The nearest residences are located within 200 feet of the site, but greater than 200 feet from the area of known soil contamination.

TABLE 1
WASTE CONTAINMENT AND HAZARDOUS SUBSTANCE IDENTIFICATION[1]

SOURCE TYPE	SIZE (Volume/Area)	ESTIMATED WASTE QUANTITY	SPECIFIC COMPOUNDS	CONTAINMENT[2]	SOURCES OF INFORMATION
Aboveground TCA tank	500 gallons	Unknown	TCA	10	HLA 1992
Contaminated soil	Unknown	Unknown	PCE TCE TCA 1,1-DCE 1,2-DCE	10	HLA 1993

1 Use additional sheets if necessary.

2 Evaluate containment of each source from the perspective of each migration pathway (e.g., groundwater pathway -non-existent, natural or synthetic liner, corroding underground storage tank; surface water - inadequate freeboard, corroding bulk tanks; air - unstabilized slag piles, leaking drums, etc.)

TABLE 2
HYDROGEOLOGIC INFORMATION[1]

STRATA NAME/DESCRIPTION	THICKNESS (ft.)	HYDRAULIC CONDUCTIVITY (cm/sec)	TYPE OF DISCONTINUITY[2]	SOURCE OF INFORMATION
Dawson Aquifer: sandstone and conglomerate	< 100	7×10^{-5} to 1×10^{-3}	Pinches out	HLA 1993
Denver Aquifer	800 to 1,000	1.8×10^{-4} to 5.4×10^{-4}	None identified	HLA 1993

1 Use additional sheets if necessary.

2 Identify the type of aquifer discontinuity within four miles from the site (e.g., river, strata pinches out, etc.).

APPENDIX C

CERCLA Eligibility Worksheet

CERCLA Eligibility Worksheet

Site Name Metrum Facility

City Littleton State Colorado

EPA ID Number COD042638239

Note: The site is automatically CERCLA eligible if it is a Federally owned or operated RCRA site.

I. CERCLA Eligibility

Did the facility cease operations prior to November 19, 1980? No

If YES, then STOP. The facility is probably a CERCLA site.
If NO, continue to part II

II. RCRA Deferral Factors

Did the facility file a RCRA Part A application? No

If YES:

1. Does the facility currently have interim status? No
2. Did the facility withdraw its Part A application? No
3. Is the facility a known or possible protective filer? (filed in error)
4. Does the facility have a RCRA operating or post closure permit?
5. Is the facility a late (after 11/19/80) or non-filer that has been identified by the EPA or the State? (facility did not know it needed to file under RCRA)

Type of facility:

Generator ✓ Transporter Recycler
TSD (Treatment/Storage/Disposal)

If all answers to questions 1, 2, and 3 are NO, STOP. The facility is a CERCLA eligible site.

If answer to #2 or #3 is YES, STOP. The facility is a CERCLA eligible site.

If answer to #2 and #3 are NO and any other answer is YES, site is RCRA, continue to part III.

III. RCRA Sites Eligible for the NPL

Has the facility owner filed for bankruptcy under Federal or State laws?

Has the facility lost RCRA authorization to operate or shown probable unwillingness to carry out corrective action? _____

Is the facility a TSD that converted to a generator, transporter or recycler facility after November 19, 1980? _____

IV. Exempted substances:

Does the release involve hazardous substances other than petroleum? _____

V. Other programs: The site may never reach the NPL or be a candidate for removal. We need to be able to refer it to any other programs in EPA or state agencies which may have jurisdiction, and thus be able to effect a cleanup. Responses should summarize available information pertaining to the question. Include information in existing files in these programs as part of the PA. Answer all that apply.

Is there an owner or operator?

NPDES-CWA: Is there a discharge water containing pollutants with surface water through a point source (pipe, ditch, channel, conduit, etc.)?

CWA (404): Have fill or dredged material been deposited in a wetland or on the banks of a stream? Is there evidence of heavy equipment operating in ponds, streams or wetlands?

UIC-SDWA: Are fluids being disposed of to the subsurface through a well, cesspool, septic system, pit, etc.?

TSCA: Is it suspected that there are PCB's on the site which came from a source with greater than 50 ppm PCB's such as oil from electrical transformers or capacitors?

FIFRA: Is there a suspected release of pesticides from a pesticide storage site? Are there pesticide containers on site?

RCRA (D): Is there an owner or operator who is obligated to manage solid waste storage or disposal units under State solid waste or ground water protection regulations?

UST: Is it suspected that there is a leaking underground storage tank containing a product which is a hazardous substance or petroleum?

APPENDIX D

PA Site Reconnaissance Report

SITE DISCOVERY RECONNAISSANCE REPORT
performed by URS Consultants, Inc.

SITE Metrum

ADDRESS 4800 East Dry Creek Road - Littleton, Colorado 80122

DATE May 5, 1995.

INVESTIGATORS Ron Coringrato, URS Consultants, Inc.

SITE CONTACT Lorna Hauf - Safety/Environmental Manager

WEATHER, WIND Cloudy, temperature ~ 55°, wind from the southeast

GENERAL SITE CONDITIONS (sources, operations, activities, etc.)

Site contains main building, small credit union building to east, parking areas to the north and east of building (paved), open land to the south (vegetated), accessible to public, workers were present, cars in parking lot, no visible indications of contamination.

CRITICAL TARGET & PATHWAY INFORMATION

☐ Site Access Can access parking area and open land to the south.

☐ Stressed Vegetation None observed.

☐ Odors None detected.

☐ Overland Flow/Surface Water Runoff To southeast and west-northwest

☐ On-site Recreational Activities None.

☐ Endangered Species None observed.

☐ Wells Monitoring wells in open space to the south of the building.

☐ Fishing Activity None.

☐ Water or Soil Staining None observed.

☐ Nearest Residence (address) 7721 South Forest Street (closest occupied residence).

DO ANY SITE CONDITIONS POSE A THREAT TO THE ENVIRONMENT OR NEARBY POPULATION REQUIRING THAT THE SITE SAM BE NOTIFIED IMMEDIATELY AND THAT AN IMMEDIATE POTENTIAL THREAT MEMORANDUM BE SENT TO THE EPA?

No X Yes _____ (if yes, when?) _____

SIGNATURE OF INVESTIGATOR Kristin S. Otto for Ron Coringrato DATE 7/18/96

APPENDIX E

Site Photolog

Color Photo(s)

The following pages contain color that does not appear in the scanned images.

To view the actual images, please contact the Superfund Records Center at (303) 312-6473.

PHOTO 1

The Metrum facility looking west. The exposed soil area in the foreground is the location of a future residential development.

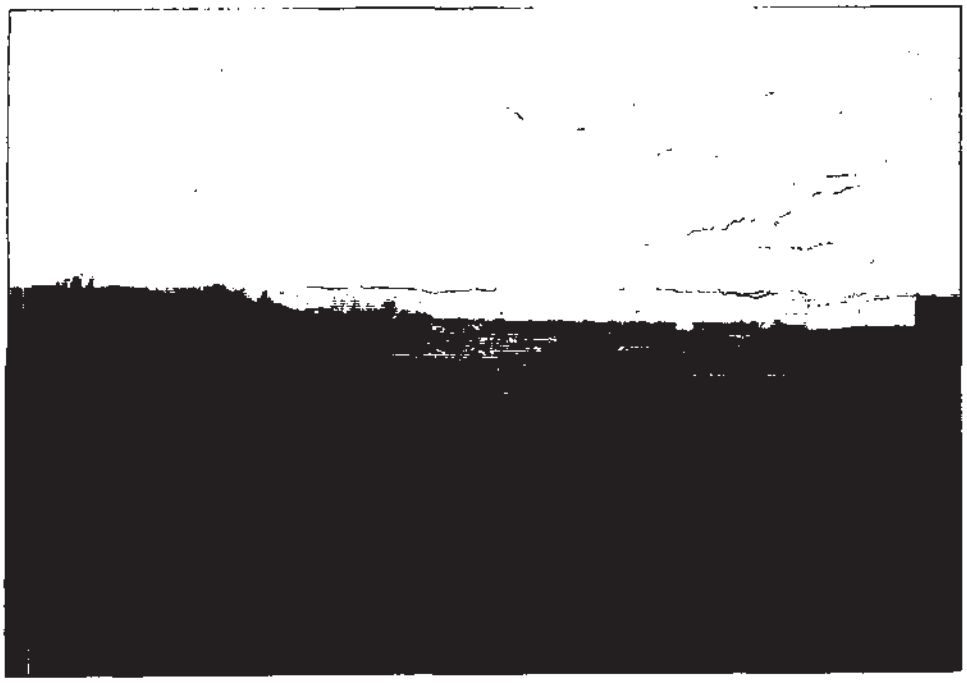


PHOTO 2

Looking west at the southern portion of the site from adjacent future residential development. Note proximity of residential development to the south.

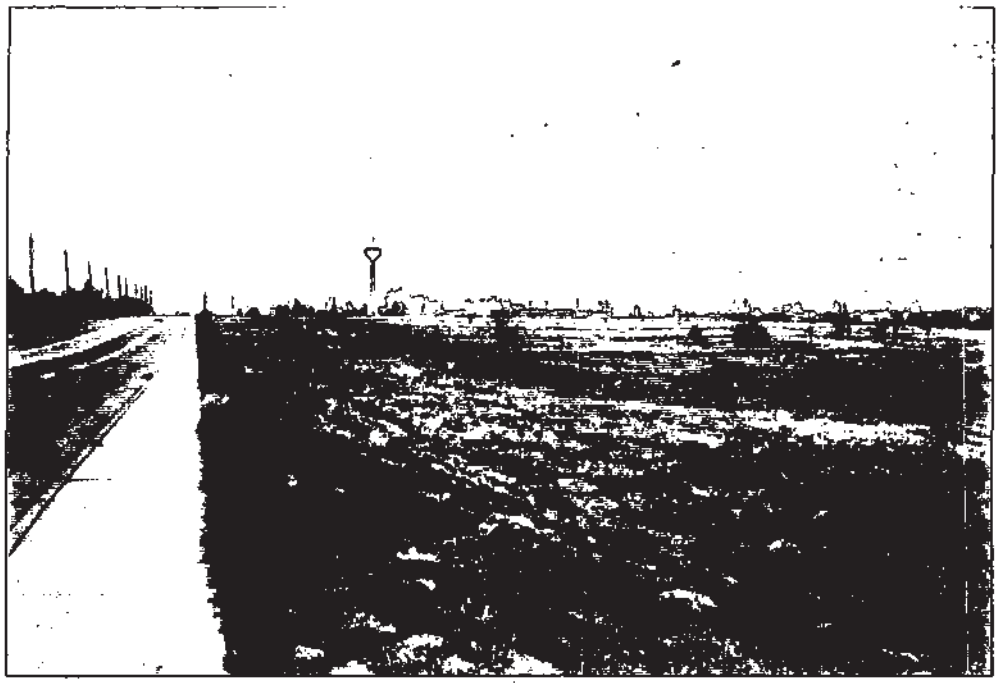


PHOTO 3

Looking southeast at the site (background) from Dry Creek Road (to the left). Undeveloped land borders the site on the west (foreground).